Prevalence and Associated factors of Menopause Among Bangladeshi Women Aged 30-49 Years: A Country Based Cross-Sectional Study

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ABSTRACT: Menopause is one of the most significant events that cause some physiological changes affecting the life of a woman permanently. Women with early menopause suffer from stress, anxiety and depression. Menopause is affected by the woman's health, weight, nutrition, life style, culture and genetic factors. The objective of this study was to determine the prevalence and associated factors of menopause among Bangladeshi women aged 30-49 years. Data was extracted from the 2014 Bangladesh Demographic and Health Survey (BDHS-2014). BDHS-2014 collected data from overall Bangladesh using two stages stratified cluster sampling. Chi-square test and logistic regression models were used in this study. This study revealed that the prevalence of early menopause among Bangladeshi married women was 17.9%. Chi-square test showed that some socio-demographic factors were significantly associated with menopause and these factors were considered as independent variables in multiple logistic regression analysis. Multiple logistic model demonstrated that women living alone got menopause 1.397 times higher than their counterparts ($p<0.01$). Muslim women had 1.503 times higher chance to get early menopause ($p<0.01$) than those of other religion. Early married women got early menopause 0.788 times higher ($p<0.05$) than their counterparts. It was observed that underweight woman reached menopause 1.198 times higher than normal and overweight woman ($p<0.05$). It was found that women with higher education was less likely to get menopause than uneducated ($p<0.01$), primary ($p<0.01$) and secondary educated ($p<0.01$) women. Hosmer and Lemeshow test (χ^2-value=7.647, p=0.469) showed that our selected model was good fitted to data. In this study, some modifiable factors were found as the important predictors of early menopause among Bangladeshi women. These findings can help to government and non-government organizations for taking initiatives to reduce the prevalence of early menopause in Bangladesh.

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INTRODUCTION

Menopause is an important life event in every woman's life resulting from loss of ovarian follicles and noticeable by abeyance of menstruation (Beckman *et al.,*'95). During this time, ovary stops to produce estrogen and progesterone and abort the women's power of reproducing. Worldwide natural time for menopause is 45-66 years (WHO,'96).In Bangladesh the normal age of a woman for menopause is up to 55 years (Rahman *et al.,* 2011).It can be described as early and late menopause. If any woman's menstrual cycle stops before 45 years it is called early menopause which is manifested by heavy bleeding, spotting, periods that last longer than a week; and a woman having no bleeding for a year after 50 years is called late menopause (Panay *et al.,* 2007).Women may undergo many physical and psychological problems during this important time (Zöllner *et al.,* 2005; Park *et al.,* 2014). Pre-menopause is a term used to mean the years leading up to the last period, when the levels of reproductive hormones are becoming more variable and lower, and the effects of hormone withdrawal are present. The World Health Organization (WHO) has indexed menopause in the international classification of diseases (WHO, '96). Post menopausal women face some important impacts in the daily, social and sexual life (Hassa *et al.,* 2005; Kwak *et al.,* 2014; Kim *et al.,* 2015).They find difficult to sustain in every aspect of their daily life, as they cannot do things easily what they could do before. This issue affects the family, society and the economy as well.To the best of our knowledge, only one study has been conducted in menopausal symptoms with Bangladeshi population (Rahman *et. al.*, 2011). The policy makers should be finding a way to reduce the effect of early menopausal symptoms in the very least amount.

The aim of the present study is to determine the prevalence and associated factors of menopause among Bangladeshi women aged 30-49 years.

MATERIAL AND METHODS

The data used in the present study was extracted from the cross-sectional dataset collected by Bangladesh Demographic and Health Survey (BDHS-2014) conducting from May 21 to August 17, 2014. BDHS-14 collected data from Bangladeshi married women of reproductive age (15 to 49 years). This was a national-level survey with the various districts of Bangladesh represented. The nationally representative sample population of this study consisted of 4078 Bangladeshi women. At the time of the survey their ages ranged from 30 to 49 years with an average of 38.48 years. The survey used the list of enumeration areas (EAs) prepared for the 2014 Population and housing censusas a sampling frame which was provided by the Bangladesh Bureau of Statistics (BBS). The primary sampling unit (PSU) for the survey was an EA having an average of 120 households. This is a socio-demographic survey in seven administrative divisions of Bangladesh: Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, and Sylhet. Each division is subdivided into zilas, and each zila into upazilas. Each urban area in an upazila is divided into wards, and into mohallas within a ward. A rural area in the upazila is divided into Union Parishads (UP) and mouzas within a UP. The survey was based on a two-stage stratified sampling of households. In the first stage, 600 EAs were selected with probability proportional to the EA size, with 207 clusters in urban areas and 393 in rural areas.With this design, the survey selected 18,000 residential households, to have one ever married woman from each of the households for interview. Actually data from 17,863 married women were collected.The data set was checked for outliers by the present authors using statistical techniques, abnormal points can affect the interpretation of results (Stevens, '96). Some missing values were also detected and these cases were excluded. Pregnant women were also excluded. Women below 30 years were also excluded from the study. After removing outliers, cases with incomplete data, and excluding currently pregnant women, the data set was reduced to 4078 for the analysis in the present study.

Outcome variable: The outcome variable of this study was the menopause status of Bangladeshi married women aged 30-49 years. BDHS-2014 defined menopausal women as women who were neither pregnant nor postpartum amenorrheic, but who have not had a menstrual period in the six months preceding the survey. Women who reported that they had a hysterectomy were also defined as menopausal. According to menopause status, the outcome variable was categorized into two categories such as (i) menopausal (yes, code=1), (ii) non menopausal (no, code=0).

Independent variables: The independent variables used in the study were: divisions (Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, Sylhet),type of place of residence (urban/rural); highest educational level (none, primary, secondary, higher); mode of delivery for last birth (caesarean or vaginal); currently breastfeeding (no or yes); husband's education level (none, primary, secondary, higher); women's occupation (housewife, working outside); regular menstruation (yes or no); currently marital status (yes or no); total ever born children ($\leq$2, 3-5, 6$\geq$); age at first birth (early child bearing (age<20, age$\geq$21); women age group (30-34, 35-39, 40-44, 45-49); living with husband (yes or no); wealth index (poor, middle, rich); number of family members ($\leq$4, 5-7, 8$\geq$); religion group (Muslim or Non-Muslim); husbands' occupation group (farmer, hard workers, service holder, unemployed, businessman); BMI group (underweight, normal and overweight).

Descriptive statistics, Chi-square test and binary logistic regression were used in this study to determine prevalence, associated factors and effect of selected factors on early menopause respectively among Bangladeshi married women aged 30-49 years.Statistical significance was accepted at $p < 0.05$. Statistical analysis was carried out using SPSS software (IBM, version 21.0).

RESULTS

In this study, the prevalence of early menopause and its associated factors were investigated among Bangladeshi women (aged 30-49 years). This study revealed that the prevalence of menopause among Bangladeshi women was 17.90%, among them 10.80% and 43.70% were early and late menopause respectively (Figure 1).

The association between menopause and the socio economic factors are presented in Table 1. Only the significant associated factors with menopausal status of Bangladeshi women are shown in Table 1. The highest prevalence of menopausal women was found in Rangpur division (21.0%) followed by Khulna (19.9%), Rajshahi (19.5%), Dhaka (18.9%), Barisal (17.0%), Sylhet (14.4%) and Chittagong (14.1%) divisions. The association between these two factors was statistically significant ($p<0.01$). It was found that prevalence of menopause was higher among uneducated (21.1%) women than primary educated (17.2%), secondary (11.7%) and higher educated (4.3%) women. The association was statistically significant ($p<0.01$). It was observed that the prevalence of menopause was higher (19.0%) among women married at <18 years than their counter parts (12.6%), and the association was statistically significant ($p<0.01$). It was noted that the prevalence of menopause among Bangladeshi women who lived with their husbands was higher (89.1%) than those who did not live with their husbands (10.9%). The association was statistically significant ($p<0.01$). In the present study it was found that 58.9% women having 3-5 children were menopausal followed by 25.30% having $\leq$2, and only 15.8% having $\geq$6 children.The association was statistically significant ($p<0.01$). It was revealed that the prevalence of menopause among Bangladeshi women was 30.4% in 30-34 years age group, 24.1% in 35-39 years, 24.0% in 40-44 years, and 21.6% in 45-49 years age groups. The association between menopause and their age group was statistically significant ($p<0.01$). This study showed that 47.1% women were menopausal whose family consisted of 5 to 7 members followed by 40.2% with $\leq$4 members and 12.6% with $\geq$8 members. The association between menopause and number of family member was statistically significant ($p<0.05$). It was noted that 18.4% Muslim women already reached menopause while only 13.5% non-Muslim women got menopause, the association between religion and menopause was significant ($p<0.01$). The prevalence of under nutrition, normal and over nutrition among women was 35.0%, 64.8% and 0.2% respectively. The number of menopause women decreased with increasing their body size, and the association between these two factors was statistically significant ($p<0.05$) (Table 1).

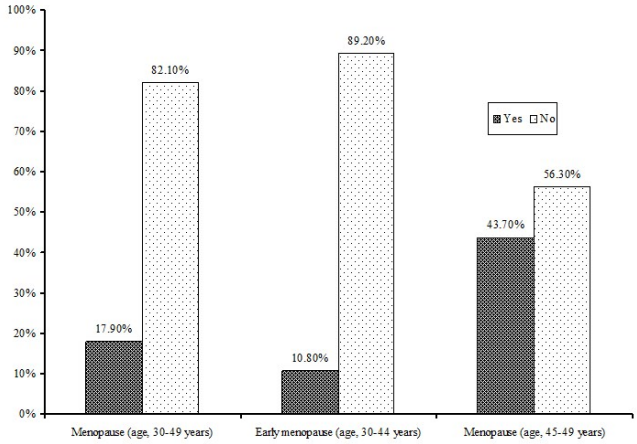

Figure 1. Prevalence of menopause among the women

Table 1. Association between menopausal status of the women with the socio-demographic variables.

Variables	TotalN (%)	Menopause		χ^2 value	P value
		No N (%)	Yes N (%)		
Division	Barisal 554 (13.6)	460(83.0)	94(17.0)	17.805	0.007
	Chittagong 538 (13.2)	462(85.9)	76(14.1)		
	Dhaka 607 (14.9)	492(81.1)	115(18.9)		
	Khulna 527 (12.9)	422(80.1)	105(19.9)		
	Rajshahi 549 (13.5)	442(80.5)	107(19.5)		
	Rangpur 673 (16.5)	532(79.0)	141(21.0)		
	Sylhet 630 (15.4)	539(85.6)	91(14.4)		
Women educational level	No education 1953(47.9)	1540(78.9)	413(21.1)	43.974	0.001
	Primary 1350(33.1)	1118(82.8)	232(17.2)		
	Secondary 681(16.7)	601(88.3)	80(11.7)		
	Higher 94(2.3)	90(95.7)	4(4.3)		
Age at first	Age at first married ≥18 years, 736 (18.0)	643 (87.4)	93 (12.6)	16.801	
	Age at first married<18Years, 3342 (82.0)	2706 (81.0)	636 (19.0)		0.001
Currently marital status	No (444,10.9)	316 (71.2)	128 (28.8)	40.712	0.001
	Living with husbands (3634, 89.1)	3033 (83.5)	601 (16.5)		
Total ever born children	N≤2 Children1031 (25.3)	878 (85.2)	153 (14.8)	13.955	0.001
	3-5 Children 240 (58.9)	1967 (81.9)	434 (18.1)		
	6≥ Children 646 (15.8)	504 (78.0)	142 (22.0)		
Women age group (year)	30-34, 1239(30.4)	1165 (94.0)	74 (6.0)	580.534	0.001
	35-39, 982 (24.1)	900 (91.6)	82 (8.4)		
	40-44, 978 (24.0)	789 (80.7)	189 (19.3)		
	45-49, 879 (21.6)	495 (56.3)	384 (43.7)		
Number of family members	≤4 (1641, 40.2)	1309 (79.8)	332 (20.2)	10.658	0.005
	5-7 (1922, 47.1)	1613 (83.9)	309 (16.1)		
	8≥ (515, 12.6)	427 (82.9)	88 (17.1)		
Religion group	Muslim 3611 (88.5)	2945 (81.6)	666 (18.4)	6.911	0.009
	Others 467 (11.5)	404 (86.5)	63 (13.5)		
BMI	Under nutrition1428 (35.0)	1138 (79.7)	290(20.3)	8.942	0.013
	Normal 2642(64.8)	2204 (83.4)	438(16.6)		
	Over nutrition 8(0.2)	7(87.5)	1(12.5)		

All significantly associated factors were considered as independent variables in logistic regression model for getting their effect on menopause. It was observed that the standard error (SE) of each

independent variable was laid between the magnitude values of 0.001 and 0.5, there is no evidence of multicollinearity problem. According to the fitted model, there were four variables appeared as the significant predictors in case of early menopause in Bangladeshi women.The variables were;respondents' education level, age at first marriage, currently marital status, women age group, religion group and nutritional status have the significant effect on menopause.These significant predictors have been shown in Table 2. This model demonstrated that after controlling the effect of other variables, uneducated [AOR= 2.909; CI: 0.990-8.545; p<0.05] and primary educated [AOR= 2.859; 95% CI: 0.974-8.393; p<0.05] women were more likely to have menopause earlier than higher educated women. Women age group of (45-49) were more likely to get early menopause than age group (40-44 years) [AOR=0.310, 95% CI: 0.251-0.383; p<0.001], age group 35-39 years [AOR=0.122, 95% CI: 0.094-0.160; p<0.001] and age group 30-34 years [AOR=0.089, 95% CI: 0.067-0.119; p<0.001]. It was found that marital status has significant effect on early menopause. Women living alone had 1.397 times more chance to get early menopause than the women living with husband [AOR=1.397 (95% CI: 1.084, 1.801; p<0.001)]. From the table, we observed that religion has significant effect on menopause with Muslim religion group were found to get [AOR=1.503, 95% CI: 1.108-2.037; p<0.05] risk of early menopause than the other religion group. It was found that age at first marriage had significant effect on menopause with less 18 years women were found to get [AOR=0.788, 95% CI: 0.605-1.026; p<0.05]. Finally, it was found that normal weight and overweight women were less likely to get early menopause than underweight [AOR= 1.198, 95% CI: 0.998-1.437 p<0.05] women. The Nagelkerke R square values showed that the multiple binary logistic regression models can be explained by 22.1% of the variation in the outcome variable (early menopause). In this study, Hosmer and Lemeshow test (χ^2-value=7.647, p=0.469) showed that our selected model was good fitted for the data (Table 2).

Table 2. Results of multiple logistic regression analysis of the effect of socio-economic and demographic factors on early menopause among the women.

Variable	B	S.E	Wald	df	p-value	AOR	95.0% CI for AOR	
							Lower	Upper
No education Vs Higher[R]	1.068	0.500	3.771	1	0.049	2.909	0.990	8.545
Primary Vs Higher[R]	1.050	0.500	3.652	1	0.046	2.859	0.974	8.393
Age at first married								
≥18 years Vs<18 years[R]	-0.239	0.135	3.134	1	0.047	0.788	0.605	1.026
Currently marital status								
Living alone Vs living with husband[R]	0.335	0.130	6.674	1	0.010	1.397	1.084	1.801
Women age group			403.698	3	0.001			
30-34 Vs 45-49[R]	-2.414	0.146	274.024	1	0.001	0.089	0.067	0.119
35-39 Vs 45-49[R]	-2.100	0.137	234.998	1	0.001	0.122	0.094	0.160
40-44 Vs 45-49[R]	-1.171	0.107	118.802	1	0.001	0.310	0.251	0.383
Religion group								
Muslim Vs others[R]	0.407	0.155	6.876	1	0.009	1.503	1.108	2.037
BMI group								
Under nutrition Vs normal and over nutrition[R]	0.180	0.093	3.761	1	0.049	1.198	0.998	1.437
Goodness of fit	Hosmer and Lemeshow Test				Chi-Square		p-value=0.469	
	Nagelkerke R-square Value = 0.221				Value=7.647			

N.B: B=Co-efficient, SE=Standard Error, R= Reference case, AOR=Adjusted Odds ratio, CI=Confidence Interval.

DISCUSSION

The data used in this study, gathered by the 2014 BDHS, are nationally representative covering both urban and rural areas. Previous studies in Bangladesh have tried to establish the relationship between menopause and socio-demographic and behavior factors (Jesmin *et al.,* 2012a; Rahman *et al.,* 2011), but they used much smaller data sets that were not representative of the nation. Present study may be the first to examine the association between socio-economic, demographic and anthropometric factors and age at menopausal status among Bangladeshi women. It was found that the prevalence of menopause among Bangladeshi women aged 30-49 years was 17.90%. In Kushtia, Bangladesh, it was found that

23.96%, 42.43% and 33.59% were pre-menopausal, perimenopausal and post-menopausal women respectively (Rahman *et al.,* 2011). Among the Indian women aged 30-49 years prevalence of menopause around 18% (Mozumdar and Agrawal, 2015).The prevalence of menopause in Bangladesh according to this study than the prevalence rate of early menopause in some other countries such as, Bangladesh (39.3%), USA (19.0%), India (12.62%), Japan (7.6%), China (44.0%) (Jesmin *et al.,* 2012b; Chaya *et al.,* 2017**)**. Looking at the whole sample population, it was noted that the significant variables were division, women education level, religion, age at first married, total ever born children, age group, numbers of family members, BMI category and husband's occupation group. All significant variables came from multiple logistic regressions. In Bangladesh, there are seven major administrative regions (divisions). Multiple logistic regression analysis was used to minimize the cluster effect of the data set BDHS-2014. Besides the prevalence of early menopause in Bangladesh, this study also analyzed the divisional rate of early menopause among the married women of the representative regions. Among the regions, the prevalence of early menopause was highest in Chittagong division and lowest in Rangpur division. The socio-economic condition rates are higher in Chittagong division compared to Rangpur division. Therefore, these facts could be prospective reasons of the highest prevalence of early menopausal rate in Chittagong division and the lowest in Rangpur division. These analysis of the sample population showed that prevalence of menopausal women was highest among uneducated women. Logistic regression model demonstrated that higher educated married women in Bangladesh were less likely to get menopause earlier than comparatively lower educated women. It was found that the highest number of menopause was followed by age group 45-49 years (43.7%) and the lowest numbers of menopause were followed by age group 30-34 years (6.0%). Usually, increasing the number of menopause is increasing with increasing age group. This study showed that the mean BMI of married Bangladeshi women between the ages of 15 and 49 years was 21.27 kg/m^2. Underweight women constituted 35% of the study population, while normal weight, overweight and obesity women constituted 65%. Bangladesh Government has a target to get achievement regarding mothers' morbidity under Sustainable Development Goals (SDGs) by 2030. Women get menopause during their reproductive is great health concern and they have more chance to get some diseases. The health authorities of Bangladesh Government and Non-government organization should especially take care about women who already have got menopause, and take initiative to find the causes why women get menopause in their reproductive age in Bangladesh. We hope and believe that our findings can help health authorities for this purpose. The major strength of this study was to investigate the prevalence and associated factors of early menopause among Bangladeshi women using the nationally representative sample. However, this study has a number of noteworthy limitations. This study was an analysis of secondary data and as it is bounded by the limitation of those data. The foremost limitation of this study was cross-sectional study. Since the study was a cross-sectional study, it was difficult to set up a causal relationship between the socio-economic, demographic and anthropometric factors and early menopause in married women (30-49 years) in Bangladesh. Our study findings were not necessarily generalizable to community setting or smaller facilities. In spite of the above shortcomings, the findings of this study would be contributed to understand and to recognize the factors associated with early menopause among Bangladeshi married women. Clearly more research is required regarding mode of menopause among Bangladeshi married women.

CONCLUSION

In the present study, we determined the prevalence of menopause and its associated factors among Bangladeshi women aged 30-49 years using Bangladesh Demographic and Health Survey-2014 data. A total of 4078 married women aged 30-49 years were considered as the sample in the present study. Descriptive statistics, Chi-square test and binary logistic regression analyses were used in this study. This study demonstrated that a remarkable number of Bangladeshi women (17.9%) got menopause earlier. Early menopause among Bangladeshi women was associated with education, age at first marriage, currently marital status, religion and nutritional status of women.

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